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Wire/Cable Harnessing Wire/Cable Markers Wire/Cable Accessories

- 1. Cable Ties 2. Adjustable P-Clip
- 3. Cradleclip 4. Strapping 5. Spiroband
- 6. Z-Type Markers 7. C-Type Markers
- 8. S-Type Markers 9. Grommet Strip
- 10. PVC Wiring Duct





Outstanding Advantages

- Self-locking, providing permanent, neat harnessing
- Tough, smooth, virgin nylon for indoor and weather stabilized black nylon for outdoor use
- Four sizes will fit all bundle diameters from $\frac{1}{16}$ through $\frac{3}{16}$ inches
- Each size, infinitely adjustable within its given range
- Requires only light hand tension to thread through its self-locking head
- Can be used for virtually any harnessing configuration

Description

The Electrovert EL Cable Tie is an improved harnessing device designed with a superior locking system to provide optional application either by hand or tool, and, when used with a tool, be universally applicable with all approved tools.

Molded of the finest, virgin nylon, the Electrovert EL Cable Tie combines such outstanding physical properties as lightweight, abrasion resistance, toughness, high tensile strength, exceptional dielectric properties, resilience and minimum absorption rate, with chemical resistance to common solvents, alkalies, dilute acids, oils and grease.

Specifications

Material: (a) Strap: Natural nylon per MIL-M-20693, Type I: weather stabilized black per MIL-M-20693, Type II: (b) Strap Lock: Metal per QQ-S-766.

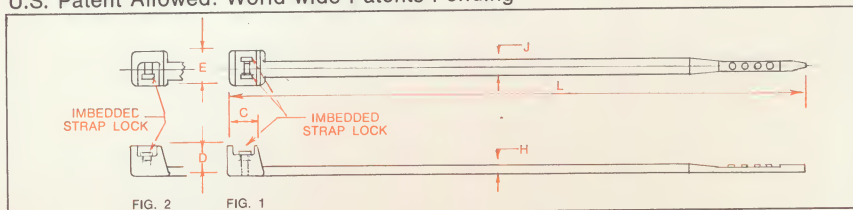
Color: Natural (upon request also in colors specified in military standards)

Design: To meet requirements of military standard MS 17821, MS 18034 and MIL-S-23190

Nylon Properties (1) (Natural)	Units	ASTM Method	Water (2) Test %	Values
Tensile Strength 73°F	psi	D-638	2.5	11,200
Elongation at Break 73°F	%	D-638	2.5	300
Yield Stress 73°F	psi	D-638	2.5	8,500
Elongation at Yield 73°F	%	D-638	2.5	25
Flexural Modulus 73°F	psi	D-790	2.5	175,000
Apparent Modulus 73°F (3)	psi		2.5	100,000
Deflection Temperature, 66 psi	°F	D-648	0.2	360
264 psi	°F	D-648	0.2	150
Brittleness Temperature	°F	D-746	0.2	-112
Brittleness Temperature	°F	D-746	2.5	-85
Izod Impact Strength 73°F	ft. lb./in.	D-256	2.5	2.0
Taber Abrasion, CS-17 wheel, 1000 g. weight	mg/1000 cycles	D-1044	2.5	6-8
Melting Point (Fisher Johns)	°F	D-789	—	482-500
Specific Heat	sq. ft./°F/in.		—	0.3-0.5
Fatigue Endurance Limit (4) 73°F	lb./sq. in.		2.5	3000
Dielectric Constant	10 ⁶ cycles	D-150	0.2	3.6
Dissipation Factor	10 ⁶ cycles	D-150	0.2	0.04
Specific Gravity		D-792	—	1.13-1.15
Water Absorption (24 hr.)	%	D-570	—	1.5
Water Absorption (Saturation)	%	D-570	—	8
Flammability		D-635	—	self-ext.
Resistance to Weathering				good
Resistance to Salt Water				excellent
Resistance to Lubricating Oils				excellent
Resistance to Lubricating Greases				excellent
Resistance to Aliphatic Hydrocarbons				excellent
Resistance to Aromatic Hydrocarbons				excellent
Resistance to Conventional Fuels				excellent
Resistance to Jet Fuel JP-3, JP-4, JP-5				excellent
Resistance to Anti-icing Fluid				excellent
Resistance to Hydraulic Fluid, Petroleum Base				excellent

1. The data as specified are average values and should not be used for specifications without consultation with Electrovert. 2. Test values specified at 0.2% water are typical of those in the as molded condition. Values at 2.5% water refer at to approximate data typical of states reached in equilibrium with the atmosphere 50% R.H. 3. Measured after 100 hours in flexure, maximum fiber stress 1000 psi. 4. Test conditions: 1800 cycles/min. with tension and compression equal. Fatigue endurance limit defined as the stress causing no failures in 2,000,000 cycles.

U.S. Patent Allowed: World-wide Patents Pending



Sizes, Dimensions, Ordering Data

Type No.	Military Dash No.	Bundle Dia Min.	(inch) Max.	Tensile Strength (lbs.) Min.	H max (in)	J max (in)	L min (in)	Installation Tool
EL-A	-4	$\frac{1}{16}$	1	18	.043	.090	$4\frac{1}{8}$	MS-17823-2 or equi
EL-B	-1	$\frac{1}{16}$	$1\frac{1}{16}$	50	.055	.175	$7\frac{1}{2}$	MS-17823-2 or equi
EL-C	-2	$\frac{1}{16}$	$4\frac{1}{16}$	50	.055	.175	$14\frac{5}{8}$	MS-17823-2 or equi
EL-D	-3	$\frac{3}{16}$	4	120	.083	.290	$14\frac{1}{4}$	MS-17824-2 or equi

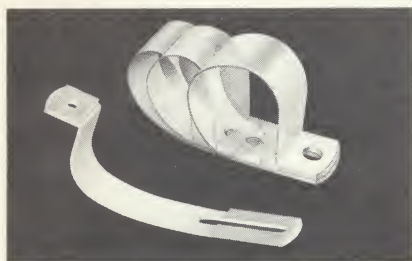
Head design type Fig. 2: EL-A; Fig. 1: EL-B, C and D.

Notes: All values above min. specified by military; actual tensile strength far exceeds values shown as can be substantiated by Test report of independent testing laboratory.

Packaging: Packaged in heavy gauge, heat sealed poly bags and carton, 100 per poly bag and cartons of 100 and 500. Bulk packaging available.

Adjustable P-Clip

2



Advantages of Adjustable Feature

Reduces Inventory—only nine sizes accommodate all bundle and cable diameters from 1/8" through 2" . . .

Controls Tension—you control the tension to fit the loop to the bundle.

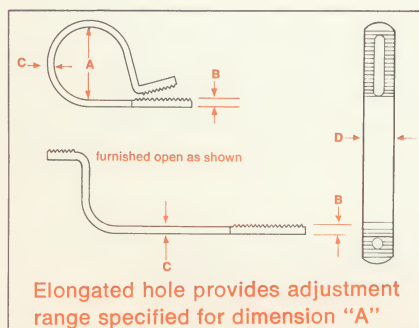
Simplifies Changes in Bundle Make-up—add or remove wires, the same clip can be adjusted to the new bundle diameter.

Description

The bottom lip of the Adjustable P-Clip is designed with an elongated hole. The top lip, can be slid either forward or backward, along any portion of this elongated hole, to accommodate a wide range of bundle diameters. Once the proper tension has been applied to the bundle, the clip is secured with a screw or rivet. Ratchet teeth provide a positive locking action that will prevent slipping even under conditions of vibration or shock.

Specifications

Material: Molded of the finest virgin nylon to provide excellent service both indoors and outdoors. Combines such physical properties as lightweight, abrasion resistance, toughness, high tensile strength, exceptional dielectric properties, resilience and minimum absorption rate, with chemical resistance to common solvents, alkalies, dilute acids, oils and greases. Other materials for special applications are available on special order.



Nylon Properties (1)

	Units	ASTM Method	Water (2) Test %	Values
Tensile Strength 73°F	psi	D-638	2.5	11,200
Elongation at Break 73°F	%	D-638	2.5	300
Yield Stress 73°F	psi	D-638	2.5	8,500
Elongation at Yield 73°F	%	D-638	2.5	25
Flexural Modulus 73°F	psi	D-790	2.5	175,000
Apparent Modulus 73°F (3)	psi		2.5	100,000
Deflection Temperature, 66 psi	°F	D-648	0.2	360
264 psi	°F	D-648	0.2	150
Brittleness Temperature	°F	D-746	0.2	-112
Brittleness Temperature	°F	D-746	2.5	-85
Izod Impact Strength 73°F	ft. lb./in.	D-256	2.5	2.0
Taber Abrasion, CS-17 wheel, 1000 g. weight	mg/1000 cycles	D-1044	2.5	6-8
Melting Point (Fisher Johns)	°F	D-789	—	482-500
Specific Heat	sq. ft./°F/in.		—	0.3-0.5
Fatigue Endurance Limit (4) 73°F	lb./sq. in.		2.5	3000
Dielectric Constant	10 ⁶ cycles	D-150	0.2	3.6
Dissipation Factor	10 ⁶ cycles	D-150	0.2	0.04
Specific Gravity		D-792	—	1.13-1.15
Water Absorption (24 hr.)	%	D-570	—	1.5
Water Absorption (Saturation)	%	D-570	—	8
Flammability		D-635	—	self-ext.
Resistance to Weathering				good
Resistance to Salt Water				excellent
Resistance to Lubricating Oils				excellent
Resistance to Lubricating Greases				excellent
Resistance to Aliphatic Hydrocarbons				excellent
Resistance to Aromatic Hydrocarbons				excellent
Resistance to Conventional Fuels				excellent
Resistance to Jet Fuel JP-3, JP-4, JP-5				excellent
Resistance to Anti-icing Fluid				excellent
Resistance to Hydraulic Fluid, Petroleum Base				excellent

1. The data as specified are average values and should not be used for specifications without consultation with Electrovert. 2. Test values specified at 0.2% water are typical of those in the as molded condition. Values at 2.5% water refer to approximate data typical of states reached in equilibrium with the atmosphere 50% R.H. 3. Measured after 100 hours in flexure, maximum fiber stress 1000 psi. 4. Test conditions: 1800 cycles/min. with tension and compression equal. Fatigue endurance limit defined as the stress causing no failures in 2,000,000 cycles.

Meets following standards and specifications where applicable: MIL-P-17091B, MIL-M-20693A, MIL-E-16400, MIL-STD-242E, MIL-E-5400F, MIL-I-983, ASTM-D-789 and ASTM-D-635.

Sizes, Dimensions, Ordering Data

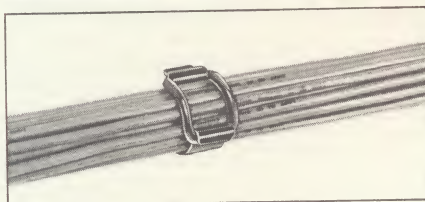
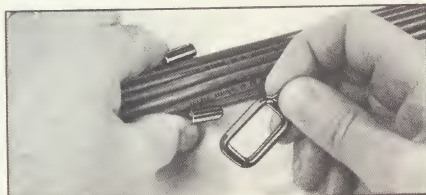
Size No.	A Bundle Range Min. Max.	B	C	D	Screw Clearance	Quantity per Package
0	1/8 3/16	.060	.025	.250	No. 4	500 and 100
1	3/16 1/4	.046	.025	.250	No. 4	500 and 100
2	1/4 3/8	.051	.030	.312	No. 6	500 and 100
3	3/8 1/2	.056	.035	.375	No. 6	500 and 100
4	1/2 5/8	.062	.040	.500	No. 6	200 and 100
5	5/8 1 1/8	.083	.055	.550	No. 10	200 and 100
6	1 1/8 1 1/2	.083	.060	.560	No. 10	100
7	1 1/2 1 3/4	.088	.065	.560	No. 10	100
8	1 3/4 2	.093	.070	.560	No. 10	100

Packaging: Packaged in heavy gauge, heat sealed poly bags and box.

Colors: standard is natural; colors available on special order.

Description

The Insuloid Cradleclip has been designed to provide a versatile wiring system that is fast and simple, and, at the same time, provide for "on-the-spot" wiring changes without replacement or the use of tools.



It is the only system of its kind for both supported and unsupported wiring. It consists of two pieces: Binders and Clips for unsupported wiring; Cradles and Clips for supported wiring.

When used for supported wiring, the Cradles may be attached to panels by a conventional bolt and nut, speed drives or drive-rivets. Also, a special Cradle is available with a captive nut for mounting from the rear of a panel. Because it raises the harness from the cabinet, the Insuloid Cradleclip System provides for better air circulation and heat dissipation.

Specifications

Material: The Binders and Cradles are molded of tough Nylon; the standard Clips of Neoprene, which combines the right degree of toughness and the necessary flexibility to hold any cable securely and yet withstand vibration without damage to the wire bundle itself.

Clips of butyl, Viton and silicon rubber in addition to neoprene are available to accommodate the broad range of applicable temperatures of from -76° to 250°F.

Colors: Standard is black. Other colors available on special order.

The Insuloid Cradleclip System meets the following specifications and standards where applicable:
MIL-P-17091B, MIL-M-20693A,
MIL-R-6855, MIL-R-6310A, MIL-STD-202;
Federal Spec. ZZ-R-601; ASTM-D-635;
CAMESA CSS-115.

Nylon Properties (1)	Units	ASTM Method	Water (2) Content	Test Values
Tensile Strength 73°F	psi	D-638	Conditioned	9000
Elongation at Break 73°F	%	D-638	Conditioned	150
Yield Point 73°F	psi	D-638	Conditioned	6300
Flexural Stiffness	psi	D-747	Conditioned	100,000
Deflection Temp. 66 psi	°F	D-648	Dry	375
Deflection Temp. 264 psi	°F	D-648	Dry	160
Izod Impact Strength -40°F	ft. lb./in.	D-256	Conditioned	0.31
Izod Impact Strength 73°F	ft. lb./in.	D-256	Conditioned	2.0
Taber abrasion, CS-17 wheel 1000g. wt (approx)	mg/1000 cycles		Conditioned	<5
Melting Point (Fisher Johns)	°F	D-789		426
Specific Gravity		D-792		1.17
Water Absorption (24 hours)	%	D-570		1.3
Water Absorption (Saturation)	%	D-570		8.0
Flammability		D-635		self-ext.
Carbon Content	%			2.0
Resistance to Weathering				excellent
Resistance to Salt Water				excellent
Resistance to Lubricating Oils				excellent
Resistance to Lubricating Greases				excellent
Resistance to Aliphatic Hydrocarbons				excellent
Resistance to Aromatic Hydrocarbons				excellent
Resistance to Conventional Fuels				excellent
Resistance to Jet Fuel JP-3, JP-4, JP-5				excellent
Resistance to Anti-icing Fluid				excellent
Resistance to Hydraulic Fluid Petroleum Base				excellent

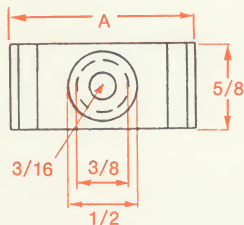
Neoprene Properties (1)	Units	ASTM Method	Test Values
Specific Gravity		D-792	1.37-1.39
Durometer Hardness (Shore A)		D-2240	70 ± 5
Tensile Strength	psi	D-412	2670
Ultimate Elongation	%	D-412	370
Modulus 300%		D-412	2150
Modulus 150%		D-412	760
Flammability		D-635	self-ext.
		MIL-R-6310A	self-ext.
Resistance to Weather & Sunlight		D-750	excellent
Aging Characteristics		D-573	excellent
Ozone Resistance, in Atmospheric Concentr.		D-1149	excellent
Resistance to Solvent, Waxes, Fats, Oils, Greases and many other Petroleum Products (3)		D-471	excellent
Resistance to Alkalies, Dilute Mineral Acids or Inorganic Salt Solutions		D-471	excellent
Resistance to Water & Salt Water		D-471	excellent

1. The data as specified above are average values and should not be used for specifications without consulting with the supplier.
2. All "Dry" data developed on test specimens containing less than 0.3% moisture; "Conditioned" data apply to specimens containing equilibrium moisture content for 73°F and 50% R.H.
3. The above information should serve for general orientation. Neoprene's degree of compatibility in a given application will depend on the specific conditions (temperature, time, concentration) under which actual exposure takes place.

Packaging: Standard packaging is 100 and 500 of each type and size.

U.S. Patent No. 3,182,940
Canada Patent No. 589,618

Cradleclip®



Cradles

Type and Size	Description	Dimensions (inches)	
		A	B
C1	Cradle	.937	.562
C1-M	Cradle with molded-in nut (1)	.937	.562
C2	Cradle	1.375	.750
C2-M	Cradle with molded-in nut (1)	1.375	.750
C3	Cradle	1.875	1.000
C3-M	Cradle with molded-in nut (1)	1.875	1.000

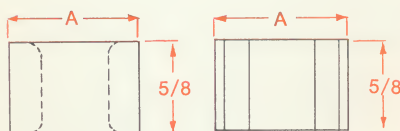
1. The nut is made of brass, which is cadmium plated and chromate treated for conformance with Fed. Spec. QQ-P-416A.



C1, C2, C3 Through-hole
for No. 8 screw



C1-M, C2-M, C3-M molded-in cadmium-plated, chromate-treated nut to take 6/32 thread bolts

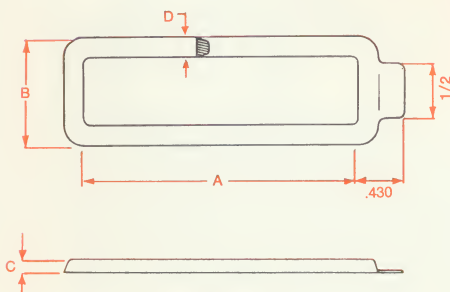


B1

B2, B12

Binders

Type and Size	Description	Dimensions (inches)	
		A	B
B1	Binder	.875	.187
B12	Binder	.937	.400
B2	Binder	1.875	.812



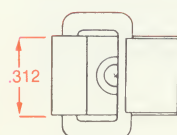
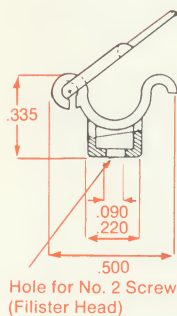
N1, N3, N5, N7

Clips

Type and Size	Description	Dimension (inches)			
		A	B	C	D
N1	Clips	.500	.937	.090	.156
N3	Clips	1.000	1.000	.115	.187
N5	Clips	1.750	1.000	.135	.187
N7	Clips	2.562	1.000	.135	.187

Miniature Cradle and Binder with Captive Clips

Type and Size	Description
CO-NO	Cradle with Captive Clip



CO-NO

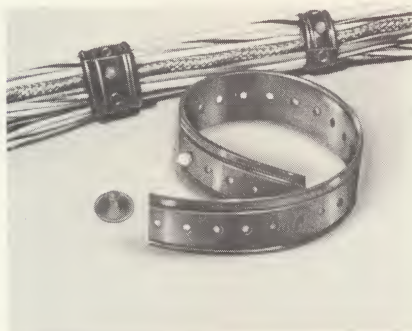
Recommended Combinations

Diameter of Cable Form (inches) (1)	Supported Wiring		Unsupported Wiring	
	Cradle	Clip	Binder	Clip
1/8-5/16	C0	N0	C0	N0
1/4-5/8	C1	N1	B1	N1
1/2-11/16	C1	N3	B1	N5
5/8-13/16	C2	N3	B12	N3
3/4-15/16	C2	N5	B12	N5
1-1 1/4	C3	N3	B2	N3
1 1/4-1 1/2	C3	N5	B2	N5
1 1/2-2	C3	N7	B2	N7

1. Applies to Nylon Cradles and Binders in combination with either Neoprene, Butyl and Viton Clips. If silicon rubber clips are considered, consult supplier.

Description

Insuloid Strapping is a widely used, versatile system for cable and wire bundling requiring no tools. It consists of two components: a nylon stud (like the old time collar button) and an elastic, plasticized PVC (Polyvinylchloride) strapping that is lighter and stronger than metal straps . . . yet will not damage wires. It is the simplest, fastest and least expensive of any tying system with the added advantage of permitting "on-the-spot" wiring changes. To install, just strap, snap, snip! And, "feed-out" reels make use and inventory control easy.



Specifications

Material: The strapping is plasticized virgin PVC, with unusual strength and elastic properties. It is the prominent properties of PVC, which has made it the most widely used insulating and jacketing material for wires and cables for both power transmission and telecommunication.

The stud is molded of nylon and is designed to securely lock the strapping, yet permit wiring changes.

Colors: Standard color for Strapping and Stud is black. Strapping is also available on special order in a variety of colors—yellow, white, green and red—for identification and coding.

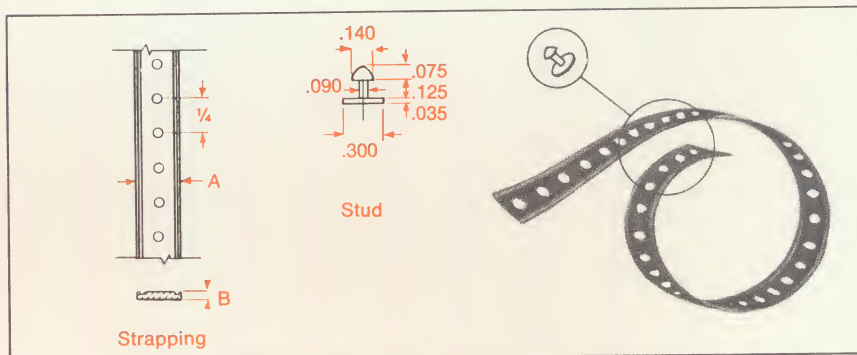
Dimensions: Strapping is available in two standard widths and thicknesses; stud is one standard size.

The Electrovert Insuloid Cable Strapping meets NASA requirements for Cable Strapping used in space vehicle ground support equipment. Meets MIL-I-631C Type F, Grade a.

Strapping	Method	ASTM Units	Test Values
PVC Properties			
Tensile Strength	psi	D 412	2300 min
Ultimate Elongation	%	D 412	200 min
Durometer Hardness (Shore A)		D 2240	80 av
Cold Brittle temperature (50% non-failure)	°F	D 746	8 av
Specific Gravity (Density)		D 792	1.25-1.33
Tear Resistance	lb/in	D 624	525 av
Flammability	in/min	D 635	self-ext.
Water Absorption		D 570	.15 av

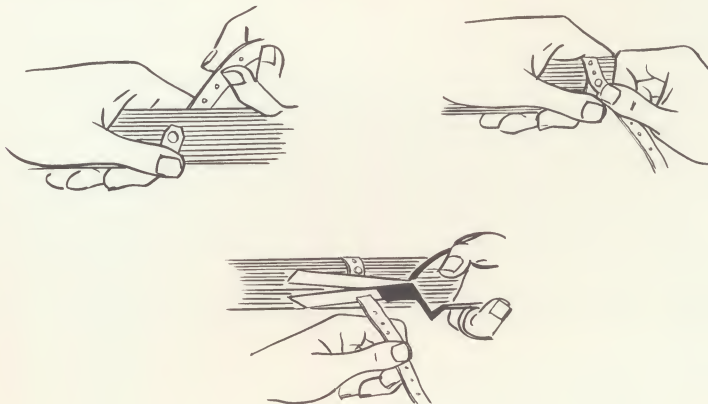
Stud	Units	ASTM Method	Test Values
Nylon Properties			
Tensile Strength	psi	D 638	9,000
Flexural Stiffness	psi	D 747	100,000
Hardness-Rockwell	R Scale	D 785	121
Specific Gravity		D 792	1.17 av
Flammability	in/min	D 635	self-extinguishing

Packaging: Strapping: 100 ft. coil in "feed-out" box, or 500 or 1000 ft. coils on reels. Studs: 1000 per box.



Dimensions, Ordering Data

Cat. No.	Description	Dimensions (inches)	
		A	B
AV-5	PVC Strapping	3/16	.035
AV-8	PVC Strapping	1/2	.050
AVS	Nylon Stud		



Outstanding Advantages

- Permits individual lead-offs or additions of wire at any point.
- Unwraps easily for changing cable make-up or tap position; retains elasticity and shape through any number of applications.
- Only 3 sizes will handle all bundle diameters from $\frac{1}{8}$ to 4 inches.

Description

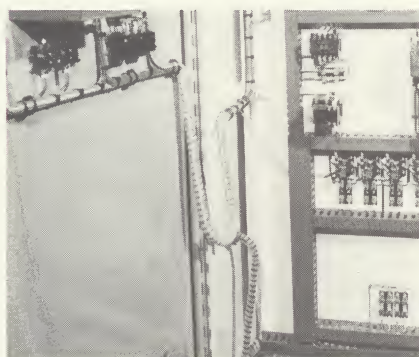
Spiroband is a flexible spiral-wrapping that forms a firm bundle of wires with both excellent mechanical and insulating protection. It is easily applied without the use of tools and can be close wound or spaced, according to the rigidity required of the finished bundle. Is moisture-proof, non-staining, non-toxic and highly resistant to most acids, alkalies, grease and oil at ordinary temperatures; will show excellent performance when exposed to both low or high temperature service conditions.

Packaging: Spiroband is packaged in special "feed-out" boxes to simplify handling and application.

Bulk OEM orders can be furnished in reels of 500 ft.



Spiroband is applied without the use of tools.



Application showing interior of control cabinet where wire bundle must lengthen and curl as door is opened and closed.

1. Clear Polyethylene (Natural): General applications where there are no special or unusual environmental conditions.

Natural Spiroband meets the following specifications and standards: ASTM D 1248-63T, Type I, Class A, Grade 4; Federal L-P-390, Type II, Class L, Grade 4; REA specifications PE-23; MIL-E-16400 "Temperature Conditions" Classes 1, 2, 3 and 4; MIL-P-3803, MIL-I-631C and MIL-E-5400F.

2. Ultraviolet and Weather-Resistant Polyethylene (Black): Contains special additives to resist UV and weathering in general. Additives color the material black.

Meets following specifications and standards: ASTM D 1248-63T, Type III, Class C; Federal Specs. L-P-390, Type III, Class L; MIL-E-5400F.

3. Fire-Resistant, Self-Extinguishing Polyethylene (Bone White): Special fire-resistant additive, colors material bone white.

Meets following specifications and standards: ASTM D 635; UL-70; MIL-E-5400F.

Property	Units	ASTM Method (other)	Clear (Natural)	Ultraviolet Resistant (Black)	Fire Resistant (Bone White)
Density		D-792	.92	.93	1.30
Tensile Strength 73°F	psi	D-412	1800	1800	1500
Elongation 73°F	%	D-412	600	600	250
Abrasion Resistance		(Taber)	22	21	27
Brittleness Temperature	°F	D-746	-121°	-105°	8°
Softening Point	°F	(Vicat)	203°	203°	180°
Dielectric Constant 10°Cy	max	D-150	2.35	2.75	2.80
Dissipation Factor 10°Cy	max	D-150	0.0005	0.0005	0.005
Flammability (burn rate)	in/min	D-635	1	1	0
Water Absorption	%	D-570	0.014	0.03	0.02
Effect of Weak Acids		D-543	Resistant		Generally re-
Effect of Strong Acids		D-543	Resistant except oxidizing acids		acts similar
Effect of Alkalies		D-543	Resistant		to natural
Effect of Organic Solvents		D-543	Resistant (below 122°F)		grade.

Sizes, Dimensions, Ordering Data

Size	Outside Dia. (inch)	Wall Thickness (inch)	Bundle Range (inch)	Length of Std. Coil (ft.)	Weight of Std. Coils (lbs.)	UV Resistant	Fire-Retardant
$\frac{1}{8}$	$\frac{1}{8}$	.032	$\frac{1}{16}$ - $\frac{1}{2}$	100	4 $\frac{1}{2}$	4 $\frac{3}{4}$	6 $\frac{1}{2}$
$\frac{1}{4}$	$\frac{1}{4}$	.045	$\frac{3}{16}$ -2	100	12 $\frac{1}{2}$	13	17 $\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$	.070	$\frac{3}{8}$ -4	25	8 $\frac{3}{4}$	9 $\frac{1}{4}$	11 $\frac{3}{4}$

Approximate Required Length of Spiroband/Ft. of Cable Bundle

Dia. of Bundle	$\frac{1}{8}$ " Spiroband		$\frac{1}{4}$ " Spiroband		$\frac{1}{2}$ " Spiroband	
	Close Coiled	$\frac{3}{16}$ " Gap	Close Coiled	$\frac{3}{8}$ " Gap	Close Coiled	$\frac{1}{2}$ " Gap
$\frac{1}{16}$	12	—	—	—	—	—
$\frac{1}{8}$	19	9	—	—	—	—
$\frac{3}{16}$	28	12	—	—	—	—
$\frac{1}{4}$	33	16	16	8 $\frac{1}{2}$	—	—
$\frac{3}{8}$	50	24	24	12	12	6 $\frac{1}{2}$
$\frac{1}{2}$	64	30	34	17	17 $\frac{1}{2}$	8 $\frac{1}{2}$
1	—	—	64	32	30	15
1 $\frac{1}{2}$	—	—	92	46	44	22
2	—	—	121	61	58	29 $\frac{1}{2}$
3	—	—	—	—	88	44
4	—	—	—	—	117	60 $\frac{1}{2}$

Electrovert Marking Systems

Electrovert Markers are available in three different types—each designed for specific wire and cable applications and requirements.

Z-Type: For applications where the markings are put on *before* the solderless terminal is attached or the solder connection is made.

C-Type: For applications *after* the solderless terminal is attached or the solder connection is made.

S-Type: For all types of cable and wire bundle applications having an O.D. of 1/2" or larger.

All of these different type markers have one thing in common—they are designed to last the life of the wire and cable under all environments and conditions. They are guaranteed not to peel-off, rub-off or fall-off . . . to resist oils, chemicals, grease and abrasion . . . impact and vibration.

Z-Type Markings**Description**

A high grade, flexible PVC marker designed to be fitted *before* the terminal is attached or solder connection made. Applied without the use of a tool and grips the cable firmly. The positive "non-slip-grip" is ensured by the unique accordion pleat design of the marker and its ability to expand up to 350% of its original size. The accordion pleat expands to slip on the cable and retracts to hold firm in position. It can be used with any type of termination—from claw and crimped type to soldered.

Any number of markers, arranged in any sequence, can be assembled to provide the necessary code. The same marker is used for either right or left hand entry.

When used with compression-type terminals, the marker can be slipped over the shank to provide insulation protection.

Specifications

Material: manufactured of finest grade, strong, durable PVC material that will resist oil, grease, acids, abrasion and chemicals.

PVC Properties

	Units	Test Values
Specific Gravity		1.21
Durometer Hardness (Shore A)		73
Tensile Strength	psi	2600
Ultimate Elongation	%	350
Dielectric Strength (20 mil specimen)	volts/mil	750
Dielectric Constant (1kc)		6.0
Dissipation Factor (1kc)		0.1
Cold Brittleness Temp. (50% non-failure)	°F	-65
Flammability		self-ext.
Fungus Resistance		non-support
Finish		glossy

Sizes, Dimensions, Ordering Data

Cat. No.	Wire / Cable Range (inches)		Dimensions (inches)				
	Min. O.D.	Max. O.D.	A	B	C	D	E
22	.045	.065	.045	.060	.136	.140	.055
20	.066	.085	.070	.065	.142	.140	.050
18	.086	.115	.088	.085	.148	.140	.040
16	.110	.135	.105	.101	.180	.140	.030
14	.130	.160	.124	.120	.205	.160	.040
12	.150	.175	.142	.136	.230	.160	.045
10	.170	.195	.158	.152	.250	.160	.045
9	.190	.215	.215	.178	.169	.160	.050
8	.210	.250	.203	.194	.303	.190	.055
7	.245	.295	.228	.219	.340	.190	.055
6	.290	.360	.270	.260	.450	.224	.060
4-1	.355	.460	.335	.325	.525	.224	.060

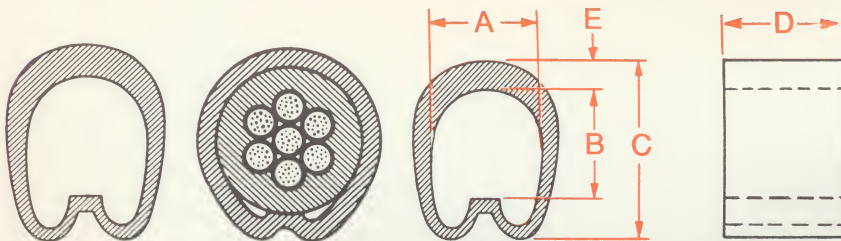
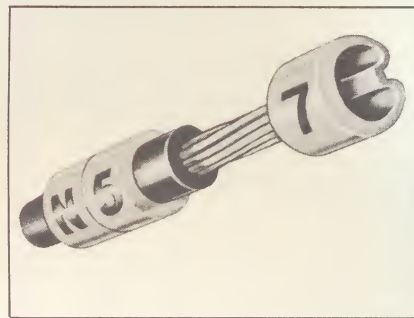
Markings: Standard—single numerals 0 to 9; letters A to Z; symbols +, -, ~. Multiple—any combination of 2, 3, 4 or 5 unit combinations of above.

Colors: White with black markings is standard. Also available in black with white markings, blue with black markings, yellow with black markings and red with black markings.

Electrovert Z-Type Markers meet the following specifications: MIL-1-631C, Type F, Form U, Grade a and b Class I, Category 1; MIL-E-16400; MIL-E-5400 (ASG); MIL-E-4158A (USAF).

Packaging: Package-engineered in coils of individual "snap-off" markers that stay attached until required—detach easily when needed.

Coils are of 50 single markers, one size, color and character in "see-through" polyethylene covered cards and 500 single markers, one size, color and character on self-servicing reels. Minimum ordering quantity per size and character—50 single white, 500 multiple, 500 colored markers.



accordion pleat expands to slip on wire and retracts to hold firmly in position. No slipping or sliding; requires no tool.

C-Type Markers

7

Description

C-Type Cable Markers are a clip-on type, specifically designed for applications *after* the solder connection has been made or solderless terminal has been attached. They may be removed at any time for re-coding without breaking the terminal connection. Any number of markers can be used according to the code required and the same marker can be used for either a left or right hand entry.

Specifications

Material: Molded of durable, rigid Polyvinylchloride (PVC). Highly resistant to abrasion, grease, oil and chemicals.

Markings: Marked with one numeral or letter to make any code combination. Available numerals 0-9, letter A-Z, and normal electrical symbols +, -, ~.

Colors: Standard is white with black markings. Other colors and markings on special order.

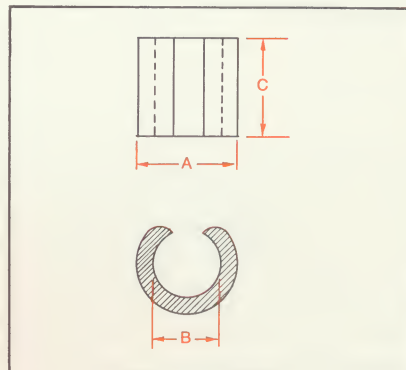
Packaging: Packaged 50 markers of same size and marking. For colors, minimum quantity is 500 per package of same size and marking.

Sizes, Dimensions, Ordering Data

Size No.	Wire / Cable Range (inches)		Dimensions (inches)		
	Min. O.D.	Max. O.D.	A	B	C
2	.080	.100	.125	.080	.130
3	.100	.118	.150	.100	.150
4	.118	.138	.172	.118	.150
5	.138	.156	.198	.138	.150
6	.156	.187	.220	.156	.150
7	.187	.218	.258	.187	.180
8	.218	.250	.293	.218	.210
9	.250	.280	.330	.250	.225
10	.280	.315	.359	.277	.250
11	.315	.350	.406	.312	.250
12	.350	.400	.453	.348	.250
13	.400	.460	.515	.397	.250
14	.460	.510	.578	.453	.250
15	.510	.570	.625	.500	.250

PVC Properties

PVC Properties	Test Values
Tensile Strength	5400 psi
Specific Gravity	1.42
Durometer Hardness (Shore A)	74 max
Softening Point-VICAT	147°F



S-Type Markers

8

Description

A flat type, rigid PVC (polyvinylchloride) cable marker assembled with a PVC covered aluminum strip, for the identification of large cables and busbars having an O.D. of 1/2 inch or greater. There is no limit on the size cable which can be identified with these markers.

Any number of markers, arranged in any sequence, can be assembled to provide the necessary code identification.

To apply simply place the flat PVC marker on the cable, insert the strip in slots, cut to size and crimp strip ends. Quick, easy and will last indefinitely . . . is unaffected by heat, cold or dampness.

Specifications

Material: manufactured of rigid PVC (polyvinylchloride) that will resist oils, grease, acids, abrasion and chemicals.

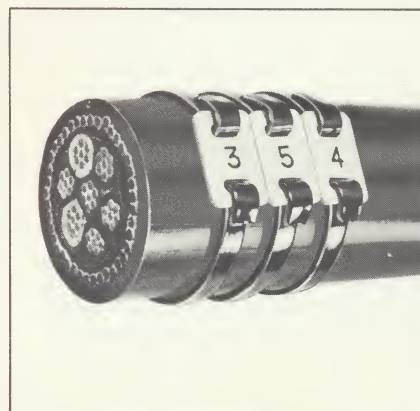
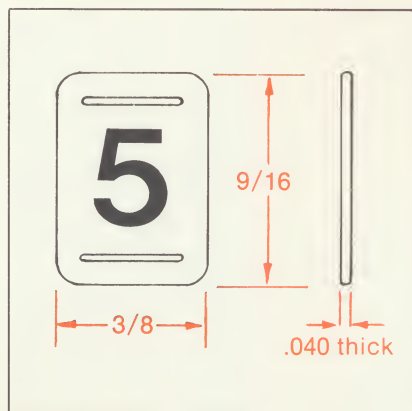
Application strip a PVC covered aluminum .157" wide x .024" thick.

Markings: numerals 0 to 9; letters A to Z, symbols +, -, ~.

Colors: standard is white with black markings. Also available in black with white markings, blue with black

markings, green with black markings, yellow with black markings and red with black markings.

Packaging: The rigid cable marker itself is packaged 50 per poly bag of same size and character; PVC covered aluminum strip in 165 ft. coils. For colors minimum quantity is 500.



Outstanding Advantages

- The most versatile and economical grommet available.
- Just "snip-n-fit" to any size or shape opening: round, square, rectangular and oval holes.
- Five (5) sizes will meet nearly all requirements from 20 Gauge sheet to ¼ inch plate thicknesses.
- Requires no tools or special adhesives—designed to grip the surface tightly and won't jar loose.
- Lightweight polyethylene; practically impervious to atmospheric gases, ozone, dampness, acids, oils and corrosion.

Description

A continuous length, one strip grommeting material designed for all sizes of cutouts in panels and sheet fabricated equipment. Just five sizes will replace hundreds of pre-formed stock grommets . . . reduce inventory, simplify ordering. Wherever wires, tubing or anything must pass through an opening or over an edge, that will result in fraying, abrasion or cutting, Grommet Strip will provide the necessary protection. And, for just pennies!

To apply, just snip with shears or blade and fit into hole. No tools or special skill required. Electrovert Grommet Strip is being used almost everywhere—in aircraft, computers, raceways, machinery, control panels, etc.

Specifications

Standard material is natural low density polyethylene. Also available, on request, both in ultraviolet- and weather-resistant, and flame-resistant polyethylene formulations.

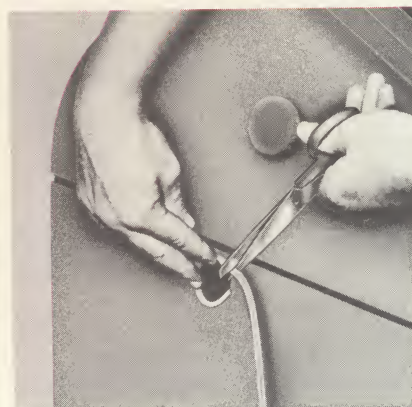
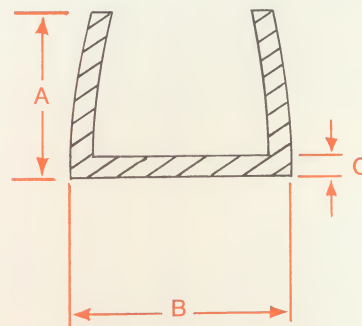
The standard, clear Grommet Strip meets the following specifications and standards: ASTM-D 1248-63T, Type I, Class A, Grade 4; Federal Spec L-P-390, Type II, Class L, Grade 4; REA Specifications PE-23 MIL-P-3803; MIL-I-631C; and MIL-E-16400, Classes 1, 2, 3 and 4. (Specifications and standards of UV-Weather-resistant and fire-resistant grades are same as those listed under description of Spiroband).

Property	Units	ASTM Method (other)	Clear (Natural)	Ultraviolet Resistant (Black)	Fire Resistant (Bone White)
Density		D-792	.92	.93	1.30
Tensile Strength 73°F	psi	D-412	1800	1800	1500
Elongation 73°F	%	D-412	600	600	250
Abrasion Resistance		(Taber)	22	21	27
Brittleness Temperature	°F	D-746	-121°	-105°	8°
Softening Point	°F	(Vicat)	203°	203°	180°
Dielectric Constant 10 ⁶ Cy	max	D-150	2.35	2.75	2.80
Dissipation Factor 10 ⁶ Cy	max	D-150	0.0005	0.0005	0.005
Flammability (burn rate)	in/min	D-635	1	1	0
Water Absorption	%	D-570	0.014	0.03	0.02
Effect of Weak Acids		D-543	Resistant		Generally re-
Effect of Strong Acids		D-543	Resistant except oxidizing acids		acts similar
Effect of Alkalies		D-543	Resistant		to natural
Effect of Organic Solvents		D-543	Resistant (below 122°F)		grade.

Sizes, Dimensions, Ordering Data

Size No.	Dimensions (inch)			Application	Packaging Ft./Coil
	A	B	C		
2	.130	.120	.040	20 Ga. and smaller	100
2A	.150	.160	.042	18 to 16 Ga.	100
3	.170	.170	.042	14 to 12 Ga.	100
4	.175	.240	.045	11 to 8 Ga.	100
5	.215	.290	.045	8 Ga. to ¾ thick	100
6	.275	.370	.055	¾ to 1¼ thick	50

Packaging: Grommet strip is packaged in coils and special "feed-out" boxes to simplify handling and application. Bulk OEM orders can be furnished in reels of 500 ft. Can also be furnished in pre-cut strips at additional charge.



Outstanding Advantages

- Snap-on Cover provides for quick, simple attachment... permits convenient inspection of wiring as well as accessibility for wiring changes.
- Rigid, high impact PVC — non-flammable, warp-proof, non-brittle, non-corrosive, non-staining, lightweight, resistant to oils, grease and acids.
- Extra wide and deep wiring slots provide for maximum fill.
- Open top-slot design for inserting wires without threading.
- Can be easily cut with a saw to desired lengths and to form tees or right angles.

Description

Electrovert Wiring Duct is a neat, simple and efficient means of installing and distributing wiring. It is available in four sizes with both the Duct and Cover molded of Polyvinylchloride (PVC).

Mounting holes, $\frac{1}{8}$ " diameter, are provided every 6" for securing by screw, rivet or drive nut.

Available in black and standard 5 ft. lengths. Other colors and lengths for special requirements are available on inquiry.

Typical applications include: panels, relays, telephone lines, switchgear, computers, electronic systems.

CSA Approved No. LR22888

1. Material:

Rigid, high impact PVC.

2. Fixing:

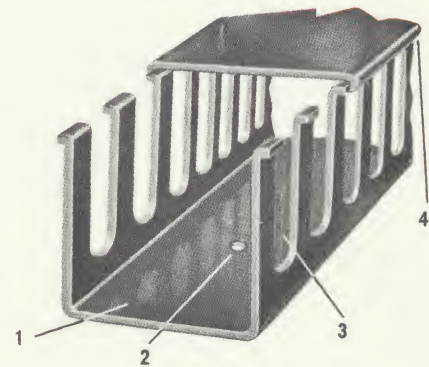
$\frac{1}{8}$ " diameter holes provided for securing screw every 6".

3. Wiring:

Open slot to provide fast cable take off.

4. Cover:

Snaps on or off.



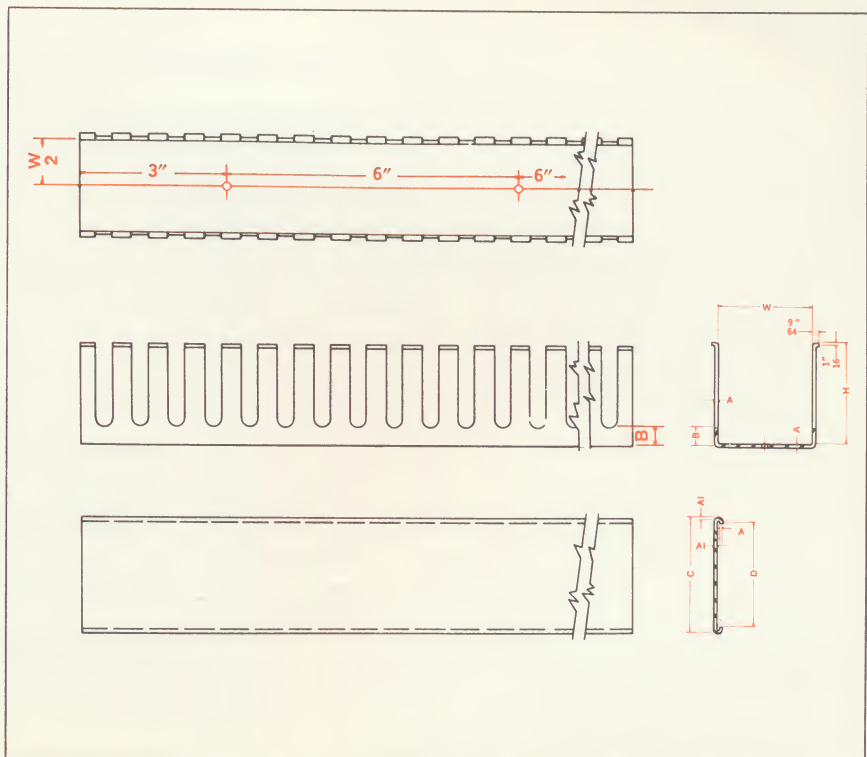
PVC Properties

	Units	Test Values
Maximum Stress @Yield	psi	12500
Compressive Stress @Yield	psi	10040
Deformation Under Load (2000 psi, 24 hrs. at 122° F)	%	1.25
Electrical Volume Resistivity (122° F)	ohm-cm	1.4×10^{16}
Dielectric Strength (short interval) 73° F	volt/mil	321
Dielectric Strength (cycling) 73° F	volt/mil	313
Temperature Range	°F	-20 to +140

Sizes, Dimensions, Ordering Data

Cat. No.	Dimensions (inches)								Lengths/Ctn
	W	H	A1	A	B	C	D	L	
CD-1012	1	$1\frac{1}{4}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	60	15
CD-1020	1	2	$\frac{1}{16}$	$\frac{3}{4}$	$\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{1}{8}$	60	10
CD-2020	2	2	$\frac{5}{64}$	$\frac{5}{64}$	$\frac{3}{8}$	$2\frac{1}{2}$	$2\frac{3}{32}$	60	6
CD-3030	3	3	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{1}{2}$	$3\frac{3}{16}$	$3\frac{3}{16}$	60	5

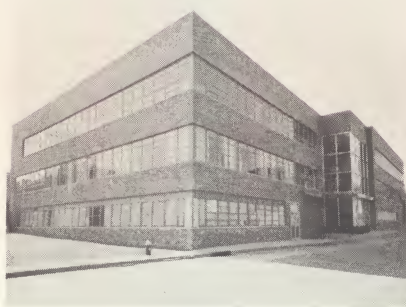
Minimum order: 1 carton



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This catalog is designed to serve as a general reference guide for manufacturers and engineers in the specification and selection of wire/cable harnessing, marking and accessory products.

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It has been the policy of Electrovert to make available to the industry products which represent a true advance in application, technical features and cost savings. Also we recognized that there is no one "best" method of solving all wire and cable harnessing and marking problems; individual requirements will

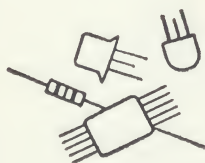
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